2011
NATIONAL ELECTRICAL CODE®
STYLE MANUAL

FOREWORD

April 1999

The *National Electrical Code* is used nationally and internationally as the basis for safeguarding persons, buildings, and their contents from hazards arising from the use of electricity. It is vitally important that the text be as explicit as possible and that maximum consistency be achieved in the language used in the text. The *Code* contains those provisions considered necessary for safety and thus is widely used as a basis for legal enforcement in the installation of electrical conductors and equipment in buildings and certain other premises (as detailed in the *Code* itself); this places a major responsibility on those involved in the preparation of the document to use forms of expression that promote uniform interpretation.

The Technical Correlating Committee of the National Electrical Code Committee has recognized these responsibilities and has issued this manual.

Preparation and Date of Adoption. This manual was originally prepared by the Editorial Task Group of the National Electrical Code Committee and adopted by the National Electrical Code Technical Correlating Committee on May 13, 1969. It was amended September 22, 1975, October 11, 1984, October 12, 1989, and May 9, 1994.

In January 1999, the Technical Correlating Committee Task Group on the Usability of the NEC rewrote the manual. It was adopted by the Technical Correlating Committee on March 19, 1999 and by the Standards Council on April 15, 1999. It was amended March 1, 2001, January 15, 2003, and August 9, 2011

Valuable guidance in the preparation of this manual was provided by several members of the Technical Correlating Committee.

TABLE OF CONTENTS

Foreword 2

Chapter 1 General 4
1.1 Purpose 4
1.2 Scope 4
1.3 Regulatory Adoption 4
1.4 Examples 4

Chapter 2 Document Structure and Numbering 5
2.1 Subdivisions of the NEC 5
2.2 Content of NEC Subdivisions..... 8
2.3 Tables and Figures..... 9
2.4 Numbering Practices..... 10
2.5 General References to Other Articles 11
2.6 Exceptions 12

Chapter 3 Editorial Guidelines 13
3.1 Mandatory Rules, Permissive Rules, and Explanatory Information 13
3.2 Word Choices 15
3.3 Writing Style 18

Chapter 4 References and Extracts 22
4.1 References to Other NEC Rules 22
4.2 References to Other Standards 22
4.3 Extracts 23

Chapter 5 Editorial Administrative Responsibilities 24
5.1 General 24
5.2 Responsibilities of Committee Members 24
5.3 Responsibilities of NFPA Staff 24

Annex A — Editorial Guidance on Exceptions 25

Annex B — Standard Terms 27

Annex C — Conversion Reference Table 37

Index 40

CHAPTER 1 GENERAL

1.1 Purpose. The *National Electrical Code (NEC) Style Manual* is prepared under the guidance of the NEC Technical Correlating Committee and is used to advise members of the Code-Making Panels on the required editorial style and arrangement of the *NEC*. It is intended to be used as a practical working tool to assist in making the *NEC* as clear, usable, and unambiguous as possible.

1.2 Scope. This *Manual* provides editorial and administrative requirements for writing the *National Electrical Code*® (NFPA 70) and the Standard for Electrical Safety in the Workplace (NFPA 70E). Except as otherwise specified in this manual, the *NEC*® and the Standard for Electrical Safety in the Workplace shall comply with the *Manual of Style* for NFPA Technical Committee Documents.

1.2.1 Requirements Not Included. The *NEC Style Manual* does not include many purely editorial and stylistic matters, including, but not limited to, the formatting of tables, capitalization practices, use of hyphens, and units of measurement. For information on these editorial guidelines, see the *Manual of Style* for NFPA Technical Committee Documents..

1.2.2 Format. The *NEC* is formatted differently from other NFPA standards. Examples of these differences include, but are not limited to, arrangement of the document, its internal numbering system, and use of informational notes. The Secretary of the NEC Technical Correlating Committee shall be responsible for recommending to the NEC Technical Correlating Committee resolutions of any apparent conflicts or discrepancies between the *Manual of Style* for NFPA Technical Committee Documents and this manual.

1.3 Regulatory Adoption. Because the *National Electrical Code* is intended to be suitable for adoption as a regulatory document, it is important that it contain clearly stated mandatory requirements in the Code text. This should encourage uniform adoption of the *National Electrical Code* without alterations.

1.4 Examples. The examples shown throughout this manual are intended to be representative of the style and arrangement of the text. The actual text used in the example may or may not match the current document text.

CHAPTER 2 DOCUMENT STRUCTURE AND NUMBERING

2.1 Subdivisions of the *NEC*. The *National Electrical Code* shall be organized as follows.

2.1.1 Introduction. Article 90 contains the scope of the *NEC* and administrative provisions.

2.1.2 Chapters. Chapters are major subdivisions of the *NEC* that cover broad areas and are divided into articles. Chapters shall be organized as follows:

Chapter 1 General
Article 100 — Definitions
Article 110 — Requirements for Electrical Installations

Chapter 2 Wiring and Protection
Articles 200 – 299

Chapter 3 Wiring Methods and Materials
Articles 300 – 399

Chapter 4 Equipment for General Use
Articles 400 – 499

Chapter 5 Special Occupancies
Articles 500 – 599

Chapter 6 Special Equipment
Articles 600 – 699

Chapter 7 Special Conditions
Articles 700 – 799

Chapter 8 Communications Systems
Articles 800 – 899

Chapter 9 Tables

2.1.3 Articles. Articles are chapter subdivisions that cover a specific subject such as grounding, overcurrent protection, lighting fixtures, and so on. Each article shall have a title. Articles are divided into sections and sometimes into parts.

2.1.4 Parts. If an article is sufficiently large, or where necessary to logically group requirements, it shall be permitted to be subdivided into parts that correspond to logical groupings of information. Parts shall have titles and shall be designated by Roman numerals. (See example.) Parts typically consist of a number of sections; see 2.4.2.1 for section numbering in articles that are subdivided into parts.

Example:

I Installation
II Construction Specifications
III Grounding

2.1.5 Subdividing Sections. Sections shall be permitted to be subdivided for clarity, with each subdivision representing either a rule or a part of a rule. Up to three levels of subdivisions shall be permitted, and any level shall be permitted to contain a list.

2.1.5.1 List Formats. Lists are a method of structuring the items necessary to complete a rule. Lists in any subdivision level shall be numbered, and listed items shall be single words, phrases, or sentences. Items in a list shall not contain titles.

2.1.5.2 Subdivision Titles. First and second level subdivisions shall have titles. Third level subdivisions shall be permitted to have titles.

2.1.5.3 Subdivision Example. The following illustrates typical subdivision numbering with lists (see also 2.4):

Example:

Chapter — **Chapter 2 Wiring and Protection**

Article — **Article 250 — Grounding**

Part — **II Conductors**

Section — **250.121 Identification and Size of Equipment Grounding Conductors.** Unless otherwise required in this *Code,* equipment grounding conductors shall be permitted to be bare, covered, or insulated.

Level 1 — **(A) Identification of Conductors.** An insulated or covered conductor larger than No. 6 copper or aluminum shall be permitted to be identified, at the time of installation, by one of the following means:

List item — (1) Stripping the insulation or covering from the entire exposed length.
List item — (2) Coloring the exposed insulation or covering green.
List item — (3) Marking the exposed insulation or covering with green tape or green adhesive labels.

Level 1 — **(B) Size of Conductors.**

Level 2 — **(1) General.** Copper, aluminum, or copper-clad aluminum equipment grounding conductors of the wire type shall not be smaller than shown in Table 250.122.

Level 2 — **(2) Adjustment for Voltage Drop.** If conductors are adjusted to compensate for voltage drop, equipment grounding conductors shall be adjusted according to circular mil area.

Level 2 — **(3) Conductors in Parallel.** If conductors are run in parallel, the equipment grounding conductors shall be sized by either of the following methods.

Level 3 — (a) Each parallel equipment grounding conductor shall be sized on the basis of the ampere rating of the overcurrent protective device. If ground-fault protection for equipment is installed, each parallel equipment grounding conductor run in a raceway shall be to be sized in accordance with Table 250.122.

Level 3 — (b) Parallel equipment grounding conductors in multiconductor cables shall be permitted to be sized in accordance with the Table 250.122 on the basis of the trip rating of the ground-fault protection if the following conditions are met:

List item — (1) Only qualified persons will service the installation.
List item — (2) The trip rating is not greater than the ampacity of a single conductor.
List item — (3) The ground-fault protection is listed for the purpose.

2.1.6 Annexes. Annexes (previously known as appendixes) shall contain references, examples, calculations, tables, and similar nonmandatory material. Annexes do not form part of the requirements of the *National Electrical Code*, and a statement to that effect shall appear at the beginning of each annex. Annexes shall have titles and shall be designated by capital letters.

Example:

Annex C
Conduit and Tubing Fill for Conductors and Fixture Wires of the Same Size

This annex is not a part of the requirements of this Code but is included for informational purposes only.

Annexes that are used to cross-reference material from one edition of the Code to another edition of the Code shall remain as an annex for a minimum of two code cycles. NFPA staff shall have the responsibility of updating any cross-reference annex.

2.2 Content of *NEC* Subdivisions.

2.2.1 Scopes. Each article shall have a scope, which shall be the first section of the article. The approval of article scope statements is the responsibility of the Technical Correlating Committee.

Example:

Article 422 — Appliances
422.1 Scope
Article 280 — Surge Arresters
280.1 Scope

2.2.2 Definitions. Definitions shall be in alphabetical order and shall not contain the term that is being defined. Definitions shall not contain requirements or recommendations.

2.2.2.1 Article 100. In general, Article 100 shall contain definitions of terms that appear in two or more other articles of the *NEC*.

Examples:

Enclosure. The case or housing of apparatus, or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts, or to protect the equipment from physical damage.

Ground. A conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or to some conducting body that serves in place of the earth.

2.2.2.2 Definitions in Other Articles. If an article contains one or more definitions, the definition(s) shall be in the second section, shall be listed in alphabetical order, and shall be styled as shown in the following examples.

Examples:

280.2 Definition.

Surge Arrester. A protective device for limiting surge voltages by discharging or bypassing surge current, and it also prevents continued flow of follow current while remaining capable of repeating these functions.

318.2 Definition.

Cable Tray System. A unit or assembly of units or sections and associated fittings forming a rigid structural system used to securely fasten or support cables and raceways.

2.3 Tables and Figures.

2.3.1 Mandatory. Tables and figures, including any accompanying notes, represent mandatory requirements, unless specifically noted as in 2.3.2. Tables and figures shall be referenced in the text and shall be designated by the number of the *NEC* rule in which they are referenced. Each table shall have a title and each figure shall have a caption. Titles and captions shall be as brief as possible, consistent with clarity.

Example:

500.5(D) Marking. Approved equipment shall be marked to show the class, group, and operating temperature referenced to a 40°C ambient. Numbers marked on the equipment nameplates shall be in accordance with Table 500.5(D).

Table 500.5(D) Identification Numbers.

2.3.2 Nonmandatory. When the *NEC* is adopted into law, graphics in the text of the document become mandatory. If a Code-Making Panel wishes to use a table or figure to illustrate only a typical situation, not a mandatory requirement, that table or figure shall be identified as an informational note or be placed in an annex. Each table shall have a title and each figure shall have a caption.

2.4 Numbering Practices. The following two practices are intended to improve NEC usability by preventing the continual renumbering of articles and sections from one edition to the next.

2.4.1 Parallel Numbering Within Similar Articles. To the extent possible, Code-Making Panels are encouraged to use the same section numbers (and part numbers, where applicable) for the same purposes within articles covering similar subjects.

Example: A typical family of articles might be organized as follows:

Article 399 — Future Products
- I General
  - 399.1 Scope
  - 399.2 Definition
  - 399.3 Other Articles
- II Installation
  - 399.10 Uses Permitted
  - 399.11 Uses Not Permitted
  - 399.13 Bends
- III Construction Specifications
  - 399.20 General
  - 399.21 Sizes
  - 399.22 Marking

2.4.2 Nonconsecutive Numbering. Articles and sections in the *NEC* are, in general, numbered consecutively. However, gaps or unused numbers are sometimes left for future articles and sections. Assigning numbers to new articles is the responsibility of the NEC Technical Correlating Committee, advised by the NFPA Staff Editor. Assigning numbers to new sections within articles is the responsibility of Code-Making Panels, advised by the NFPA Staff Editor.

2.4.2.1 Parts. If an article is subdivided into parts, it is recommended that the section numbering within each part start with the next decade as a minimum.

Example:

Article 498 — Future Equipment
- I General
  - 498.1 – 498.6
- II Disconnecting Means
  - 498.10 – 498.24
- III Branch-Circuit Conductors
  - 498.50 – 498.58
- IV Provisions for Combination Loads
  - 498.100 – 498.110

2.4.3 Numbering Informational Notes. If there are two or more consecutive informational notes, each shall be numbered.

Example

210.12 Arc-Fault Circuit-Interrupter Protection.
(A) Dwelling Units. All 120-volt, single phase, 15 and 20 ampere branch circuits supplying outlets installed in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas shall be protected by a listed arc-fault circuit interrupter, combination-type, installed to provide protection of the branch circuit.

Informational Note No.1: For information on types of arc-fault circuit interrupters, see UL 1699-1999, Standard for Arc-Fault Circuit Interrupters.

Informational Note No.2: See 11.6.3(5) of NFPA 72-2010, National Fire Alarm and Signaling Code, for information related to secondary power supply requirements for smoke alarms installed in dwelling units.

Informational Note No.3: See 760.41(B) and 760.121(B) for power-supply requirements for fire alarm systems.

2.5 General References to Other Articles. If a listing is made of references to other articles under the section title “Other Articles,” the listing shall be in table format and shall comply with 2.3.

2.6 Exceptions.

2.6.1 Placement and Order. Exceptions shall immediately follow the main rule to which they apply. Where exceptions are made to items within a numbered list, the exception shall clearly indicate the items within the list to which it applies. Exceptions containing the mandatory terms *shall* or *shall not* are to be listed first in the sequence. Permissive exceptions containing *shall be permitted* are to follow any mandatory exceptions and be listed in their order of importance as determined by the Code-Making Panel.

2.6.2 Numbering. Where there are two or more consecutive exceptions, each shall be numbered.

CHAPTER 3 EDITORIAL GUIDELINES

3.1 Mandatory Rules, Permissive Rules, and Explanatory Information.

3.1.1 Mandatory Rules. *Shall, shall not,* and *shall not be* indicate mandatory *NEC* rules. Terms such as *is to be, shall be not,* and *must,* whose meanings are less clear, shall not be used. The terms *may* or *can* shall not be used.

3.1.2 Permissive Rules. *Shall be permitted* and *it shall be permissible* indicate allowed optional or alternate methods. (Note that these are still mandatory language and constitute rules.) The term *may* shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction.

Example:

The authority having jurisdiction may waive specific requirements in the *Code* or permit alternate methods.

3.1.3 Informational Notes. Informational notes contain explanatory information and shall be located directly after the rule they apply to. Informational Notes shall not be written in mandatory language and shall not contain requirements, make interpretations, or make recommendations. If an Informational Note is needed to explain the text of the code, consideration should be given to rewriting the text of the code to make the rule clear.

Examples of informational notes

Correct (D) 600 Volts Between Conductors. Circuits exceeding 277 volts, nominal, to ground and not exceeding 600 volts, nominal, between conductors shall be permitted to supply the following:

(1) The auxiliary equipment of electric-discharge lamps mounted in permanently installed luminaires where the luminaires are mounted in accordance with one of the following:

a. Not less than a height of 6.7m (22ft) on poles or similar structures for the illumination of outdoor areas such as highways, roads, bridges, athletic fields or parking lots

b. Not less than a height of 5.5m (18ft) on other structures such as tunnels

Informational Note: See 410.138 for auxiliary equipment limitations

(2) Cord-and-plug-connected or permanently connected utilization equipment other than luminaires

(3) Luminaires powered from direct-current systems where the luminaire contains a listed, dc-rated ballast that provides isolation between the dc power source and the lamp circuit and protection from electric shock when changing lamps.

Incorrect (D) 600 Volts Between Conductors. Circuits exceeding 277 volts, nominal, to ground and not exceeding 600 volts, nominal, between conductors shall be permitted to supply the following:

(1) The auxiliary equipment of electric-discharge lamps mounted in permanently installed luminaires where the luminaires are mounted in accordance with one of the following:

a. Not less than a height of 6.7m (22ft) on poles or similar structures for the illumination of outdoor areas such as highways, roads, bridges, athletic fields or parking lots

b. Not less than a height of 5.5m (18ft) on other structures such as tunnels

(2) Cord-and-plug-connected or permanently connected utilization equipment other than luminaires

(3) Luminaires powered from direct-current systems where the luminaire contains a listed, dc-rated ballast that provides isolation between the dc power source and the lamp circuit and protection from electric shock when changing lamps.

Informational Note: See 410.138 for auxiliary equipment limitations.

3.1.4 Exceptions. Exceptions to *NEC* rules shall be used sparingly. If used, exceptions shall convey alternatives or differences to a basic code rule. It is the responsibility of the Code-Making Panel to determine whether the principle can be expressed most effectively as a separate positive code rule or as an exception to a rule. Annex A contains commentary on exceptions.

3.1.4.1 Language. Exceptions shall be permitted to use the term*s shall, shall not,* or *shall be permitted* depending on whether they specify a mandatory requirement that is (1) different from the rule, or (2) diametrically opposite to the rule, or (3) whether they permit, but do not require, a variance from the main rule. Exceptions shall be written in complete sentences.

3.1.4.2 Excessive Numbers of Exceptions. When the number of exceptions to a specific code rule becomes excessive, the Code-Making Panel should consider a revision of the basic rule or a rearrangement of the section to better convey the objectives.

3.2 Word Choices.

3.2.1 Unenforceable Terms. The *NEC* shall not contain references or requirements that are unenforceable or vague. The terms contained in Table 3.2.1 shall be reviewed in context, and, if the resulting requirement is unenforceable or vague, the term shall not be used.

Table 3.2.1 Possibly Unenforceable and Vague Terms

Acceptable	Many
Adequate	May
Adjacent	Maybe
Appreciable	Might
Appropriate	Most(ly)
Approximate(ly)	Near(ly)
Available	Neat(ly)
Avoid(ed)	Normal(ly)
Can	Note
Care	Periodic(ally)
Careful(ly)	Practical(ly)
Consider(ed)(ation)	Practices
Could	Prefer(red)
Designed for the purpose	Proper(ly)
Desirable	Ready(ily)
Easy(ily)	Reasonable(y)
Equivalent(ly)	Safe(ly)(ty)
Familiar	Satisfactory
Feasible	Secure(ly)
Few	Several
Frequent(ly)	Significant
Firmly	Similar
Generally	Substantial(ly)
Good	Sufficient(ly)
Lightly	Suitable
Likely	Usual(ly)
Legible(y)	Workmanlike

Examples of unenforceable or vague terms:

Correct: A manual pull station shall be located *within 1 m of* each exit.
Incorrect: A manual pull station shall be located *near* each exit.

Correct: Conduit shall be supported at intervals not exceeding 10 ft.
Incorrect: Conduit shall be adequately supported at periodic intervals.

3.2.2 Expressing Maximum and Minimum Limits. Maximum and minimum limits shall be expressed with the following types of wording.

Examples:

Shall not exceed 300 volts to ground . . .
Shall have a clearance of not less than 5 cm . . .
Shall be supported at intervals not exceeding 1.5 m . . .

3.2.3 Acronyms and Uncommon Abbreviations. All acronyms and any abbreviations that are not in common use shall be spelled out with the abbreviation following in parentheses for the first use of the term in the body of each article. Each subsequent use in the article shall be permitted to be the acronym or abbreviation only.

Examples:

(A) Dwelling Units. All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified below shall have ground-fault circuit-interrupter (GFCI) protection for personnel.

(B) Nondwelling Units. All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified below shall have GFCI protection for personnel.

3.2.4 Standard Terms. Standard terms have been established through accepted use or by definition and are to be used in preference to similar terms that do not have such recognition. Annex B provides guidance for syntax, spelling, punctuation, and usage of many standard technical terms.

3.2.5 Special Terms.

3.2.5.1 Ampacity. The term *ampacity*, as defined in Article 100, applies to the current-carrying capacity of conductors only. Therefore, this term shall be used in this sense, but only in this sense. (The ampacity of a No. 14 copper conductor with 60°C insulation is 20.) On the other hand, switches, motors, and similar equipment are not rated in ampacities. Instead, they have current ratings, voltage ratings, horsepower ratings, and so on. Such equipment, therefore, shall not be specified or referred to in "ampacity" values.

3.2.5.2 Authority Having Jurisdiction. The term used to indicate any kind of inspection authority, enforcement authority, or the like, shall be the *authority having jurisdiction*. The use of this term will result in standardization, and it is in keeping with the term used in all other NFPA standards. This term is fully developed and explained in Paragraph 3-3.6.1 of the "NFPA Regulations Governing Committee Projects."

3.2.5.3 Listed by a Nationally Recognized Testing Laboratory. Use of the terms "Nationally Recognized Testing Laboratory" or "NRTL" shall be avoided. The definition of "listed" in Article 100 provides the details necessary for application in the NEC. The Nationally Recognized Testing Laboratory program, also known as NRTL, is an OSHA program for the accreditation of laboratories that test products for the workplace and is not to be applied generally in the NEC. **When used in NFPA 70 the term "Qualified Electrical Testing Laboratory" is preferred.**

3.2.5.4 Provisions on Guarding. Requirements for guarding shall be stated in as complete a manner as possible and in as nearly standardized form as can be reasonably achieved. For example, the two terms *protected against contact with live parts* and *protected against accidental contact with live parts* do not mean the same thing. It may be necessary for qualified persons to have access to live parts, or it may be desirable to provide varying degrees of protection, depending on the location. Among other things, this distinction could affect the type of ventilation louvers or drains that would be acceptable for some types of equipment. The intent of the type and degree of protection to be required should, therefore, be made clear if possible.

3.2.5.5 Provisions on Protection Against Physical Damage. If *protection against physical damage* is to be one of the requirements, this can be standardized by the use of this terminology instead of using the phrase *provided with mechanical protection* to mean the same thing. In many cases, one or two acceptable methods of providing the intended protection can be stated as examples for better understanding without restricting the rule to a specification-type requirement. There have been some cases, such as in the instance of grounding electrode conductors, where the means provided by the installer for protection against physical damage has impaired the electrical function of the conductor or equipment. This can be largely avoided by an explanatory note if the intent cannot be otherwise made sufficiently clear.

3.2.5.6 Voltage. The term *voltage* is well understood and shall be used in preference to other terms such as *potential*. Because *voltage* is expressed in volts, a requirement should be written to avoid repetition of this term if it is possible to do so without losing clarity.

Example:

Correct: A circuit supplying the primary of an isolating transformer shall not exceed 300 volts between conductors.

Incorrect: The voltage of a circuit supplying the primary of an isolating transformer shall not exceed 300 volts between conductors.

3.2.6 Formulas and Equations. Formulas and equations shall be expressed in standard mathematical symbols.

3.2.7 Units of Measurement.

3.2.7.1 Measurement System of Preference. Metric units of measurement are in accordance with the modernized metric system known as the International System of Units (SI).

3.2.7.2 Dual System of Units. The SI units shall appear first, and the inch-pound units shall immediately follow in parenthesis. In tables the SI and inch-pound units shall appear in separate columns.

3.2.7.3 Permitted Uses of Soft Conversion.

3.2.7.3.1 Trade Sizes. Where the actual measured size of a product is not the same as the nominal size, trade size designators shall be used rather than dimensions. Trade practices shall be followed in all cases.

3.2.7.3.2 Extracted Material. Where material is extracted from another standard, the context of the original material shall not be compromised or violated. Any editing of the extracted text shall be confined to making the style consistent with that of the NEC.

3.2.7.3.3 Industry Practice. Where industry practice is to express units in inch-pound units, the inclusion of SI units shall not be required.

3.2.7.3.4 Safety. Where hard conversion to SI would have a negative impact on safety.

3.2.7.4 Approximate Conversion. The conversion from inch-pound units to SI units shall be permitted to be an approximate conversion.

3.2.7.5 Standard Conversions. See Annex C for information on standard conversions.

3.2.7.6 Units. For dimensions less than 1 m, the SI unit shall be expressed as mm. For dimensions from 1 m to less than 1 km, the SI units shall be expressed in m. For dimensions of 1 km or greater, the SI units shall be expressed as km.

3.3 Writing Style. These guidelines shall be followed to help produce clear, unambiguous, *NEC* language.

3.3.1 General Guidelines.

1. Write in present tense; do not write in future tense.

Example:

Correct: No conductor shall be used in such a manner that its operating temperature exceeds that designated for the type of insulated conductor involved.

Incorrect: No conductor shall be used in such a manner that its operating temperature will exceed that designated for the type of insulated conductor involved.

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2. Use simple declarative sentence structure, and keep sentences short. Writing rules in long sentences full of commas, dependent clauses, and parenthetical expressions often creates confusion and misunderstanding. The requirement can be written in two or more short sentences, expressed using a list or table, or both.

Example:

Correct:
(D) Grounded and Grounding Conductors. If a circuit supplies portables or pendants and the circuit includes a grounded conductor, then the following shall apply.

1. Receptacles, attachment plugs, connectors, and similar devices shall be of the grounding type.
1. The grounded conductor of the flexible cord shall be connected to the screw shell of any lampholder or to the grounded terminal of any utilization equipment supplied.

Incorrect:
(D) Grounded and Grounding Conductors. Where a circuit supplies portables or pendants and includes a grounded conductor as provided in Article 200, receptacles, attachment plugs, connectors, and similar devices shall be of the grounding type, and the grounded conductor of the flexible cord shall be connected to the screw shell of any lampholder or to the grounded terminal of any utilization equipment supplied.

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3. Use common words and avoid overly complex terminology (see 3.3.4).

4. Use positive language, rather than negative, wherever possible.

Example:

Correct: Boxes used in wet locations shall be listed for wet locations.

Incorrect: Ordinary electrical boxes shall not be used in wet locations.

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5. If possible, avoid using dependent clauses, parenthetical phrases, and unclear inverted word order.

Example:

Correct: The definitions in Part I of this article apply throughout the *Code*.

Incorrect: Part I of this article contains definitions intended to apply wherever the terms are used throughout this *Code*.

3.3.2 Lists and Tables. If possible, use lists or tables to present requirements, rather than long text descriptions.

3.3.3 Plural. Unless referring to a single item of equipment, references to electrical components and parts shall be plural rather than singular. This results in greater consistency and makes it clear that the *NEC* provision refers to *all* components or parts of a given type or class.

Examples:

Correct	**Incorrect**
Luminaires	a luminaire
Receptacles	a receptacle
Switches and circuit breakers	a switch or circuit breaker
Outlet boxes and enclosures	an outlet box or enclosure
Installations shall...	an installation shall...

3.3.4 Word Clarity. Words and terms used in the *NEC* shall be specific and clear in meaning, and shall avoid jargon, trade terminology, industry-specific terms, or colloquial language that is difficult to understand. *NEC* language shall be brief, clear, and emphatic. The following are examples of old-fashioned expressions and word uses that shall not be permitted:

Above or *below* (referring to text) — avoid using to describe the location of text.

Example:

Correct: ...shall be in accordance with (a), (b), and (c).

Incorrect: ...shall be in accordance with (a), (b), and (c) below.

And such, and the like — it is preferable to rearrange the sentence to use *such as* followed by examples.

As allowed — Use *allowed* instead.

Herein — Usually this word can be dropped without affecting clarity. Otherwise say "in this section" or whatever else is actually meant by *herein.*

If - Use to indicate a condition

Provided that — Use *if* instead.

Thereof — Rewrite sentence to say *of* or *of them*.

Utilize — Use *use* instead.

When - Use to express time.

Where — Use to convey a location or a situation. Not to be used to express time.

3.3.5 Parallel Construction. Parallel construction means stating similar requirements in similar ways for greater consistency. This helps makes the *NEC* clear for users. Lack of consistency often creates confusion, causing users to ask: *Does this difference in wording represent a different requirement? Or is it simply two different ways of trying to say the same thing?* There are several kinds of parallel construction:

Organization and Numbering. If practicable, the subsections of similar articles should be numbered in the same order (see 2.4.1).

Sections. Different sections, within the same article, that reflect similar or closely related subjects, should have similar structures.

Lists. All items in a list should be parallel (that is, singular or plural, written in the same verb tense, using phrases or sentences but not a mix).

CHAPTER 4 REFERENCES AND EXTRACTS

4.1 References to Other *NEC* Rules. Use references to improve clarity of the rule. Avoid redundant use of references. Do not use a reference if the requirement is already covered by 90.3. Explanatory references shall be in informational notes.

4.1.1 References to a Part Within an Article. References shall not be made to an entire article, such as "grounded in accordance with Article 250" unless additional conditions are specified. References to parts within articles shall be permitted.

Example:

If a switch or circuit breaker serves as the disconnecting means, it shall be within sight from the motor controller and shall comply with Part IX of Article 430.

4.1.2 Other References. Use references to other *NEC* rules to avoid repeating a requirement. If used, references shall include only the number of the rule being referenced; the words *section*, *subsection*, and *paragraph* shall not be used. References shall indicate the subject of the rules being referenced; the subject shall follow the number.

Example:

Wiring and equipment in Class I, Division 1 locations shall be grounded as specified in Article 250 and with the following additional requirements...

Informational Note: See 336.10 for the definition of *first floor*.

Informational Note: See 440.22(B)(2), Exception No. 2, for branch-circuit requirements for cord- and plug-connected equipment.

4.2 References to Other Standards. References to other standards shall not be in mandatory Code text. References to product standards shall be in an informative annex. References to other Standards shall be in the Informational Notes.

4.3 Extracts.

4.3.1 Extracting Material from an NFPA Document and Including It in the *NEC*. Extracting provides an advantage over multiple references to requirements contained within other NFPA documents. Extracting has the disadvantage of creating a situation where the text of the source document and the user document are not identical due to different revision cycles.

4.3.2 Extract Requirements. To extract material from another NFPA document, the following requirements shall be met.

4.3.2.1 Reason. There shall be a specific technical reason for the extract.

4.3.2.2 Context. A section or paragraph being extracted from another document shall represent a complete thought and shall be entirely extracted. The context of the original material shall not be compromised or violated. Any editing of the extracted text shall be confined to making the style consistent with that of the *NEC* and then only with the concurrence of the committee having primary jurisdiction. Such concurrence shall be obtained through the staff liaison for the source document.

4.3.2.3 Identification. The number, title, and edition of the NFPA document from which the extract is taken shall appear at the beginning of the article in which the extract is used. The document number and paragraph from which the extract is taken shall appear in brackets at the end of the section in which the extract is used.

Example:

Article 514 — Gasoline Dispensing and Service Stations

Informational Note: Rules that are followed by a reference to [NFPA 30, xxx] in brackets contain text that has been extracted from NFPA 30-1996, *Automotive and Marine Service Station Code* (xxx represents the specific sections of that document referenced). Only editorial changes were made to the extracted text to make it consistent with this Code.

514.2 Class I Locations. Table 514.2 shall be applied where Class I liquids are stored, handled, or dispensed and shall be used to delineate and classify service stations. A Class I location shall not extend beyond an unpierced wall, roof, or other solid partition.
[NFPA 30, 7-1 and 7-3].

514.5(B) Attended Service Stations. Emergency controls as specified in Section 514.5(A) shall be installed at a location acceptable to the authority having jurisdiction (AHJ), but controls shall not be more than 100 ft (30 m) from dispensers. [NFPA 30, 9-4.5]

4.3.3 Interpretations of Extracted Material in the *NEC*. Requests for interpretations of, or proposed revisions to, the extracted text shall be referred to the NFPA technical committee that is responsible for the source document.

CHAPTER 5 EDITORIAL ADMINISTRATIVE RESPONSIBILITIES

5.1 General. Both NFPA committee members and staff shall be responsible for ensuring compliance with this manual.

5.2 Responsibilities of Committee Members.

5.2.1 Code-Making Panels. Panels shall be responsible for ensuring that the *Code* text agreed on at meetings complies with all requirements of this manual. They shall rely on the guidance of NFPA staff.

5.2.2 NEC Technical Correlating Committee. The NEC Technical Correlating Committee shall act as needed to ensure that all text appearing in the Report on Proposals (ROP), Report on Comments (ROC), and final *National Electrical Code* meets the requirements of this *Manual.*

5.3 Responsibilities of NFPA Staff.

5.3.1 NEC Staff Editor. NFPA shall assign a staff editor to assist the NEC Technical Correlating Committee in developing the final text of the *NEC*. This editor shall be responsible for advising committees, panel liaisons, and the NEC Technical Correlating Committee Secretary on matters of *NEC* style.

5.3.2 Panel Liaisons. NFPA staff serving at meetings of Code-Making Panels shall advise panels on matters of *NEC* style.

5.3.3 NEC Technical Correlating Committee Secretary. The Secretary shall be responsible for advising the NEC Technical Correlating Committee on creating *Code* text that complies with the requirements of this manual. If text approved by Code-Making Panels does not comply, the Secretary shall recommend administrative revisions needed to bring the text into compliance, while preserving the panel's intent.

Annex A
Editorial Guidance on Exceptions

Exceptions should be re-written into positive language, *if positive language achieves clarity.* The elimination of all exceptions is not intended, nor is it desirable. In some cases, deleting the word *exception* and incorporating the unedited language into a main rule may not lead to clarity. The resulting rule may appear to be self-contradicting instead.

But, in many cases, positive language is much clearer. Two good examples may be found in Sections 240-3 and 240-21. In these instances, the *Code* language once consisted of a short main rule followed by a number of exceptions.

Other good examples of writing exceptions into positive language may be found in the ROP for the 1999 *Code* cycle. Proposed 520-68(A) consisted of a main rule with four exceptions. The main rule was changed to (1) entitled "General." It is clear that this rule would generally apply. The exceptions then became (2) stand lamps, (3) high temperature applications, and (4) breakouts. In 520-68(B), an exception was clearly the easiest way to deal with the difference from the main rule, and Panel 15 retained the exception.

520.68. Conductors for Portables.

(A) Conductor Type.

(1) General. Flexible conductors, including cable extensions, used to supply portable stage equipment shall be listed extra-hard usage cords or cables.

(2) Stand Lamps. Reinforced cord shall be permitted to supply stand lamps where the cord is not subject to severe physical damage and is protected by an overcurrent device rated at not over 20 amperes.

~~Exceptions No. 1. Reinforced cord shall be permitted to supply stand lamps where the cord is not subject to severe physical damage and is protected by an overcurrent device at not over 20 amperes.~~

(3) High Temperature Applications. A special assembly of conductors in sleeving no longer than 3.3 ft (1 m) shall be permitted to be employed in lieu of flexible cord if the individual wires are stranded and rated not less than 125oC (257oF) and the outer sleeve is glass fiber with a wall thickness of at least 0.025 in. (0.635 mm).

Portable stage equipment requiring flexible supply conductors with a higher temperature rating where one end is permanently attached to the equipment shall be permitted to employ alternate, suitable conductors as determined by a qualified testing laboratory and recognized test standards.

~~Exception No. 2: A special assembly of conductors in sleeving no longer than 3.3 ft. (1 m) shall be permitted to be employed in lieu of flexible cord if the individual wires are stranded and rated not less than 125 degrees C (257oF) and the outer sleeve is glass fiber with a wall thickness of at least 0.025 in. (0.635 mm).~~

~~Exception 3: Portable stage equipment requiring flexible supply conductors with a higher temperature rating where one end is permanently attached to the equipment shall be permitted to employ alternate, suitable conductors as determined by a qualified testing laboratory and recognized test standards.~~

(4) Breakouts. Listed, hard usage (junior hard service) cords shall be permitted in breakout assemblies where all of the following conditions are met:

a. The cords are utilized to connect between a single multiple connector containing two or more branch circuits and multiple two-pole, 3-wire connectors.

b. The longest cord in the breakout assembly does not exceed 20 ft (6.1 m).

c. The breakout assembly is protected from physical damage by attachment over its entire length to a pipe, truss, tower, scaffold, or other substantial support structure.

d. All branch circuits feeding the breakout assembly are protected by overcurrent devices rated at not over 20 amperes.

~~Exception No. 4: Listed, hard usage (junior hard service) cords shall be permitted in breakout assemblies where all of the following conditions are met:~~

~~a. The cords are utilized to connect between a single multipole connector containing two or more branch circuits and multiple two-pole, 3-wire connectors.~~

~~b. The longest cord in the breakout assembly does not exceed 20 ft. (6.1 m).~~

~~c. The breakout assembly is protected from physical damage by attachment over its entire length to a pipe, truss, tower, scaffold, or other substantial support structure.~~

~~d. All branch circuits feeding the breakout assembly are protected by overcurrent devices rated at not over 20 amperes.~~k

b. Conductor Ampacity. The ampacity of conductors shall be as given in Section 400-5, except multiconductor listed extra-hard usage portable cords, that are not in direct contact with equipment containing heat-producing elements, shall be permitted to have their ampacity determined by Table 520-44. Maximum load current in any conductor shall not exceed the values in Table 520-44.

Exception: Where alternate conductors are allowed in Section 520-68(a)(3), ~~Exception Nos. 2 and 3~~, their ampacity shall be as given in the appropriate table in this *Code* for the types of conductors employed.

Annex B
Standard Terms

The following list provides guidance for syntax, spelling, punctuation, and usage for many of the standard terms used in the NEC. Many words are listed with an abbreviation to indicate usage. For example, adjective = a, noun = n, and verb = v.

A

abovegrade (a)
aboveground (a)
acknowledgment (no *e*)
adapter
adjustable-speed (a)
affect (v) = to influence; effect (n) = result
air conditioner (n)
air-condition (v)
air-conditioning (a)
airflow (a,n)
airtight (a)
airspace (a)
air-handling (a)
alternating current (n) (abbrev. ac)
alternating-current (a) (abbrev. ac)
American Wire Gage (abbrev. AWG)
ampacity
ampere (see units of measurement)
20-ampere–rated receptacle
and/or (try to avoid)
apparatus (singular and plural)
approved
arc fault (n)
arc-fault(a)
arrester (not *arrestor*)
at least (avoid; use *not less than* to indicate minimum dimension)
autoignition
authority having jurisdiction (abbrev. AHJ)
automatic-reset (a)

B

backfeed
backfill (n,v)
backup (a,n)
back-wiring spaces
belowgrade (a)
belowground (a)
bipolar
braid-covered (a)
branch circuit (n)
branch-circuit (a)
branch-circuit ground-circuit
branch-circuit overcurrent device
buildup (n)
build up (v)
busbar
buses
busing

C

cable tray
cablebus
capacitors

ceiling-suspended (paddle) fan
circuit-grounding connection
circuit-interrupting device
circuit-protective device
circular mil (a)
Class I location
Class I, Division 2, location
clean-up (n)
cleanup (v)
closed-circuit (a)
Code (initial cap and italic when referring to the *NEC*)
cold-storage warehouse
combination-load equipment
common-return (a)
communications system, utilities, equipment, and so on (not *communication*)
concrete-encased electrode
conductive-film heating elements
continuous current rating
control boards
control circuit (a)
constant-current systems
copper (Cu)
copper-clad (a)
cord- and plug-connected appliances
corner-grounded delta systems
corrosion-resistant (a)
counter space
counter-mounted (a)
countertop
crawl space
cross members
cross-connect arrays
cross section (n)
cross-sectional (a)
cubic inches (in.) (see units of measurement)
current-carrying (a)
current-limiting (a)
cut off (v)
cutoff (a,n)
cutouts (n)

D

data (singular and plural, use with plural verb)
dead-front switchboards
de-energize
deicing
delta [use symbol (Δ) in equations]
delta-connected (a)
delta corner grounded
derating
Design B motor
dipole (a)
direct buried (n)
direct-buried (a)
direct current (n) (abbrev. dc)
direct-current (a) (abbrev. dc)
disconnecting means (not disconnection means)
dripproof
drywall
dual-element fuses
ducts (as in air-handling ducts, not for use with raceways)
ductwork

dust-ignitionproof (a)
dustproof (a)
dusttight (a)

E
effect (n) = result; affect (v) = to influence
e.g. (avoid using, use instead *for example*)
electric/electrical (use to be determined by staff)
electrical (as applied to requirements, standards, codes)
electric-discharge lighting
energized (electrically connected to a source of voltage
engine–generator set
ensure (not *insure*)
equipment (singular and plural)
equipment grounding conductor
etc. (try to avoid, use *and so on*, *and so forth*, or *such as*)
Exception No. 1 (when referring to specific exception)
Exception Nos. 1 and 2 (more than one exception)
exception (general, lowercase if used alone)
explosionproof
extra-hard usage

F
faceplate (n)
face-up position
fault-interrupting device
fault–current forces
fiberglass reinforced
field connection box
field-installed (a)
fire alarm circuit
fire-extinguishing equipment
fire-resistant construction
fireproof
firestopped
fixed, electric space-heating equipment
fixed-load (a)
fixed stage equipment
flame retardant (n)
flame-retardant (a)
flat-top raceways
fluxes
foamed-in-place material
forced-air system
full-load current
full-load rating
full-voltage resistor
fuseholder

G
gal (plural), 3-gal (a)
gas–air (a)
gauge, not gage
general-purpose (a)
general-use (a)
gray buses
grain-drying systems
grid-connected systems
grille
ground-fault circuit interrupter (n) (abbrev. GFCI)
ground-fault circuit-interrupter (a) (abbrev. GFCI)
ground-fault (a)

ground fault (n)
ground-fault protective device
grounding electrode conductor
guarding
guest rooms

H
hand-carried (n)
hand-held (a)
hand-supported (a)
handhole (n)
handlamp (n)
hazardous (classified) location
headroom (n)
heat-generating equipment
heat-resistant (a)
heavy-duty (a)
hertz (rather than cycles per second) (see units of measurement)
high-heat type
high-impedance grounded neutral system
high-leg (a)
high-pressure (a)
high-tension (a)
higher-rated (a)
horsepower (see units of measurement)
hour (do not abbreviate)

I
i.e. (avoid using, use *that is*)
if (indicates condition -- can usually be used instead of *provided, provided that,* ~~*or where*~~)
igniter
ignitible (not *ignitable*)
impedance
impedance grounded neutral system
in-between (a,n)
indexes (not *indices*)
informational note (lower case when used alone in text)
inrush current
instantaneous-trip (a)
internal-combustion-driven (a)

K
knob-and-tube wiring

L
lampholder
lead-sheathed (a)
less-flammable transformers
let-through (n)
light-emitting diode (abbrev. LED)
likely (use instead of *liable*)
likely to become energized -- failure of insulation on
line-to-ground fault current
line-to-neutral loads
liquidtight (a)
live parts (electric conductors, buses, terminals, or components that are uninsulated or exposed and shock hazard exists)
load-interrupter (a)
load-side (a)
locked-rotor (a,n)
locknut (n)
long-time rating

low-power-factor (a)
low-voltage (a)
lower-rated (a)

M
make-or-break (a)
manhole
maximum
meatpacking (a,n)
messenger-supported (a)
metal (instead of metallic)
metal-clad (a)
metal-enclosed switchgear (n)
metal-sheathed (a)
metal-shield connectors (n)
metallic (use only when directly related to material)
mineral-insulated (a)
minimum
minute (do not abbreviate)
mixer–amplifier (n)
motor control (a)
motor-circuit switch (n)
motor-compressors (n)
motor-driven (a)
motor-generator (a)
motor-generator set (abbrev. MG set)
motor-starting currents
multibuilding
multiconductor (instead of multiple-conductor or multi-conductor)
multimedia
multioutlet
multiphase
multipole

N
nameplate
nameplate rating load
NEC ® (always italic, with registered trademark on first reference)
network-powered (a)
No. 20 gauge sheet metal
non–current-carrying (a)
non–grounding-type (a)
non–power-limited (a)
nonaccessible
noncontinuous
noncurrent
nondwelling unit (a)
nonexplosionproof
nonflexible
noninductive
noninterchangeability
nonmetallic
nonmetallic-sheathed (a)
nonshielded cable
nontime
not over (instead of *not more than*)
not exceeding (instead of *not more than*)
not less than

O
off-premises source
oil-break (a)
oil-filled reactors
on-premises source
open-conductor supports
open-resistance (a)
optical fiber (a)
other than a dwelling unit (avoid, use *nondwelling*)
overcurrent device
overcurrent protective device
overtemperature (n)
over-temperature (a)
overvoltage (n)

P
panelboard
parallel (instead of multiple conductors)
part-winding start induction
pendant
phase-to-phase (a)
photovoltaic
plug-in units
pole-mounted (a)
positive-pressure ventilation
power conversion system (abbrev. PCS)
power factor (abbrev. PF)
power-conditioning unit (abbrev. PCU)
power-limited (a)
power-supply cord
practicable (means feasible)
practical (means useful)
pre-amplifier
pressure terminal connectors
pressure splicing connectors
protection against physical damage (state conditions)
protector

PVC-coated (a)

R
raceway
re-fused (a)
rectifier-derived dc system
remote-control (a)
resistance temperature device (abbrev. RTD)
resistor
revolutions per minute (abbrev. rpm)
road show (a,n)
root-mean-square (a)
runoff (n)

S
screw shell
screw shell devices
second (referring to time; do not abbreviate)
secondary-circuit fault protection
secondary-to-primary (a)
semiconducting (a)
service-disconnect enclosure
service disconnecting means
service-drop conductors
service-entrance conductors
service-lateral conductors
service-supplied ac (a)
set screw type (a)
set screw (n)
sheet metal (a)
short circuit (n)
short-circuit and ground-fault protective device
short-circuit current ratings
short-time duty
shunt-trip
sidelight
side-wiring spaces
silicon controlled rectifier (abbrev. SCR)
single-conductor cable
single-phase (not 1-phase, but 2-phase, 3-phase, etc.)
single-pole (a)
skin-effect heating
small-appliance branch circuit
solid-state (a)
space-heating equipment
specific-purpose (a)
stage-lighting (a)
stage set lighting
steady-state current
steel-frame (a)
storage battery charging equipment
strain-relief (a)
strut-type (a)
sunlight-resistant (a)
sunroom
supply-side equipment
surface metal raceway
surge arrester (n)
surge-arrester (a)
surge-protective capacitors
switchboards

T
tamper-resistant (a)
temperature-rated (a)
tenpenny nail
that (use where phrase is directly related to statement; do not set off with comma)
through (instead of *thru* or *from* and *to*)
time-current characteristics
time-delay fuse
toward (not towards)
trip-type (a)
turnbuckle (n)
Type MI cable

U
under-carpet (a)
upon (overused, try to avoid; *on* usually correct)

V
voltage
voltage-drop (a)
volt (see units of measurement)
voltmeter

W
wall switch-controlled (a)
weatherproof
wet-pit (n)
when (condition of time)
where (location or situation)
which (additional information in a phrase; set off with commas)
3-wire (a)
wire-bending space
workmanlike (avoid, unenforceable)
workplace
workspace
wye circuit (n)
wye-connected (a)

X
X-ray (not X-Ray)

Units of Measurement

Code text
In the *Code* text, all units of measure, when accompanied by a number value, will be styled as follows:

feet (foot)	ft
meter	m
inch	in.
centimeter	cm
millimeter	mm
square feet	ft^2
square meter	m^2
square inch	$in.^2$
square centimeter	cm^2
square millimeter	mm^2
cubic feet per minute	ft^3/min
pounds	lb
kilograms	kg
degrees Celsius	℃
degrees Fahrenheit	℉
degree (angle)	degrees
percent	percent
thousand circular mils	kcmil
horsepower	hp (spelled out in heads)
hertz	Hz
kilovolt	kV
kilowatt	kW
kilovolt-amperes	kVA
kilovolt-amperes reactive	kVAr
volt	volt [abbreviate volt (V) when used with a number to mean rating]
ampere	ampere
watt	watt
volt-ampere	volt-ampere (spell out in heads)
megavoltampere	MVA
milliampere	mA
millivolt	mV
millivoltampere	mVA
milliwatt	mW
micrometer	µm
microjoule	µJ
joule	J
kilojoule	kJ
gallon	gal

Display text (tables, figure callouts, equations, and examples)
Units of measure are abbreviated as follows in display text. Exception: If units are used without a number preceding in a table title or table column head, units should be spelled out.

kilovolt	kV
kilowatt	kW
volt	V
ampere	A
volt-ampere	VA
kilovolt-ampere	kVA
percent	%
thousand circular mils	kcmil
degrees Celsius	℃
degrees Fahrenheit	℉

Hyphenation

Hyphenate all units of measurement when used as adjectives before a noun, except when multiple units of measurement are used in the same phrase.

Example: a 5.5-kW, 240-V dryer
a 2 in. x 2 in. x 2 in. box

Numbers

0.1 (use place-holding number before decimal)
0 through 2000 (use *through* to express range)
1000 (no comma in 4-digit numbers)
10,000
2 ½ (use case fraction)
first (not 1st)

Words or Terms Defined

When words or terms are used as themselves, they are italic.

Examples:
See Article 100 for a definition of *bonding jumper*.
The term *minimum* is used in the requirement.

Annex C
Conversion Reference Table

U.S. Customary Unit	Existing SI Unit	Proposed SI Unit	Equivalent U.S. Unit
1/32 in.		**0.8 mm**	**0.031 in.**
0.06 in.	**1.52 mm**	**1.5 mm**	**0.059 in.**
0.0625 in.	**1.59 mm**	**1.59 mm**	**0.063 in.**
1/16 in.		**1.6 mm**	**0.063 in.**
0.090 in.	**2.29 mm**	**2.3 mm**	**0.091 in.**
1/8 in.	**3.18 mm**	**3 mm**	**0.118 in.**
¼ in.	**6.35 mm**	**6 mm**	**0.24 in.**
0.375 in.	**9.52 mm**	**9.5 mm**	**0.374 in.**
3/8 in.		**10 mm**	**0.394 in.**
½ in.	**12.7 mm**	**13 mm**	**0.51 in.**
5/8 in.	**15.87 mm**	**16 mm**	**0.63 in.**
¾ in.	**19 mm**	**19 mm**	**0.75 in.**
15/16 in.	**23.8 mm**	**24 mm**	**0.945 in.**
1 in.	**25.4 mm**	**25 mm**	**0.98 in.**
1 ¼ in.	**31.8 mm**	**32 mm**	**1.26 in.**
1 ½ in.	**38 mm**	**38 mm**	**1.50 in.**
1 ¾ in.	**44.5 mm**	**45 mm**	**1.77 in.**
1 7/8 in.		**48 mm**	**1.89 in.**
2 in.	**50.8 mm**	**50 mm**	**1.97 in.**
2 1/8 in.		**54 mm**	**2.13 in.**
2 ¼ in.		**57 mm**	**2.24 in.**
2 3/8 in.		**60 mm**	**2.36 in.**
2 ½ in.	**64 mm**	**65 mm**	**2.56 in.**
3 in.	**76 mm**	**75 mm**	**2.95 in.**
3 ½ in.		**90 mm**	**3.54 in**
3 ¾ in.		**95 mm**	**3.74 in.**
4 in.	**102 mm**	**100 mm**	**3.94 in.**
4 ½ in.		**115 mm**	**4.53 in.**
4 11/16 in.		**120 mm**	**4.72 in.**
5 in.		**125 mm**	**4.92 in.**
5 ½ in.		**140 mm**	**5.51 in.**
6 in.	**152 mm**	**150 mm**	**5.91 in.**
6 ½ in		**165 mm**	**6.5 in.**
7 in		**175 mm**	**6.89 in**
7 ½ in.		**190 mm**	**7.48**
8 in.	**203 mm**	**200 mm**	**7.87 in.**
8 ½ in.		**215 mm**	**8.46 in.**
9 in.	**229 mm**	**225 mm**	**8.86 in.**
10 in.		**250 mm**	**9.84 in.**
11 ½ in.		**290 mm**	**11.42 in.**
12 in.	**305 mm**	**300 mm**	**11.81 in.**
13 in.		**325 mm**	**12.8 in.**
14 in.		**350 mm**	**13.78 in.**

15 in.	**381 mm**	**375 mm**	**14.76 in.**
16 in.	**406 mm**	**400 mm**	**15.75 in.**
17 in.		**425 mm**	**16.73 in.**
18 in.	**457 mm**	**450 mm**	**17.72 in.**
19 in.		**475 mm**	**18.7 in.**
20 in.		**500 mm**	**19.69 in.**
22 in.	**557 mm**	**550 mm**	**21.65 in.**
24 in.	**610 mm**	**600 mm**	**23.62 in.**
26 in.	**659 mm**	**650 mm**	**25.59 in.**
27 in.		**675 mm**	**26.57 in.**
30 in.	**762 mm**	**750 mm**	**29.53 in.**
36 in.	**914 mm**	**900 mm**	**35.73 in.**
38 in.		**950 mm**	**37.40 in**
40 in.	**1.02 m**	**1.0 m**	**39.37 in.**
42 in.	**1.07 m**	**1.0 m**	**39.37 in.**
44 in.		**1.1 m**	**43.30 in.**
54 in.		**1.4 m**	**55.12 in.**
96 in.	**2.44 m**	**2.5 m**	**98.43 in.**
1 ft	**305 mm**	**300 mm**	**0.98 ft**
2 ft	**610 mm**	**600 mm**	**1.97 ft**
2 ½ ft	**762 mm**	**750 mm**	**2.46 ft**
3 ft	**914 mm**	**900 mm**	**2.95 ft**
3.5 ft	**1.07 m**	**1.0 m**	**3.28 ft**
4 ft	**1.22 m**	**1.2 m**	**3.94 ft**
4 ½ ft	**1.37 m**	**1.4 m**	**4.59 ft**
5 ft	**1.52 m**	**1.5 m**	**4.92 ft**
5 ½ ft	**1.68 m**	**1.7 m**	**5.58 ft**
6 ft	**1.83 m**	**1.8 m**	**5.91 ft**
6 ft 6 in.		**2.0 m**	**6.56 ft**
6 ½ ft	**1.98 m**	**2.0 m**	**6.56 ft**
6 ft 7 in.	**2.0 m**	**2.0 m**	**6.56 ft**
7 ft	**2.13 m**	**2.1 m**	**6.89 ft**
7 ft 6 in.	**2.29 m**	**2.3 m**	**7.55 ft**
8 ft	**2.44 m**	**2.5 m**	**8.20 ft**
9 ft	**2.74 m**	**2.7 m**	**8.858 ft**
10 ft	**3.05 m**	**3.0 m**	**9.84 ft**
12 ft	**3.66 m**	**3.7 m**	**12.14 ft**
14 ft	**4.27 m**	**4.3 m**	**14.11 ft**
15 ft	**4.57 m**	**4.5 m**	**15.09 ft**
16 ft	**4.88 m**	**4.9 m**	**16.08 ft**
17 ft	**5.2 m**	**5.2 m**	**17.06 ft**
18 ft	**5.49 m**	**5.5 m**	**18.05 ft**
20 ft	**6.1 m**	**6.0 m**	**19.69 ft**
21 ft	**6.4 m**	**6.4 m**	**20.997 ft**
22 ft	**6.7 m**	**6.7 m**	**21.98 ft**
25 ft	**7.62 m**	**7.5 m**	**24.61 ft**
27 ft	**8.23 m**	**8.0 m**	**26.25 ft**
30 ft	**9.14 m**	**9.0 m**	**29.53 ft**

35 ft	**10.67 m**	**11 m**	**36.09 ft**
40 ft	**12.2 m**	**12 m**	**39.37 ft**
50 ft	**15.2 m**	**15 m**	**49.22 ft**
60 ft		**18 m**	**59.06 ft**
70 ft		**21 m**	**68.9 ft**
75 ft	**23 m**	**23 m**	**75.46 ft**
80 ft	**24.4 m**	**25 m**	**82 ft**
100 ft	**30.5 m**	**30 m**	**98.43 ft**
135 ft		**41 m**	**134.48 ft**
140 ft	**42.7 m**	**42 m**	**137.76 ft**
150 ft		**45 m**	**147.65 ft**
200 ft	**61 m**	**60 m**	**196.86 ft**
1000 ft	**305 m**	**300 m**	**984.3 ft**

INDEX

abbreviations, 15
acronym, 15
annexes, 8
conversion, 17, 32
definitions, 9, 19
document structure, 3
editorial, 4, 23
exceptions, 11, 13, 25
extracted material, 17, 23
extracts, 3, 22
figures, 3, 9
guarding, 16, 30
guidelines, 4, 17
informational note(s), 4,11, 12, 13, 21, 23
language, 2, 12, 17, 18, 19, 25
mandatory, 3, 4, 9, 10, 11, 12, 13, 21
numbering, 4, 6, 7, 10
parallel construction, 20
parts, 5, 6, 9, 10, 16, 19, 21, 30
permissive, 3, 11, 12
physical damage, 9, 16, 25, 26, 32
purpose(s), 7, 8, 10, 14, 29, 33
references, 8, 11, 13, 19, 21, 22
responsibilities, 2, 3, 24
rules, 3, 12, 21, 23
scope(s), 3, 4, 8, 10
standard(s), 2, 3, 4, 11, 15, 17, 21, 27
subdivisions, 3, 5, 6, 8
tables, 3, 4, 5, 8, 9, 17, 19, 35
terms, 9, 11, 12, 13, 14, 15, 16, 19, 27, 36
unenforceable, 13, 14, 34
units of measurement, 4, 16, 17, 27, 28, 30, 34, 35, 36
vague., 13
voltage, 7, 15, 16, 29, 31, 34
word choices, 3, 13
word clarity, 19
writing style, 3, 17